

SHUAI ZHOU

Senior Undergraduate Student

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RESEARCH INTERESTS

Motion Planning, Multi-Agent/Robot Systems, Heuristic Search

EDUCATION

SOUTH CHINA UNIVERSITY OF TECHNOLOGY

Bachelor of Engineering in Robotics, Guangzhou, China

Sep 2022 — Jun 2026 (Expected)

Cumulative GPA: 3.86/4.00, Rank: 4/56

UNIVERSITY OF CALIFORNIA, BERKELEY

Exchange Student, Berkeley, United States

Aug 2023 — Dec 2023

Cumulative GPA: 4.00/4.00

PUBLICATIONS

† denotes equal contribution

Bridging Planning and Execution: Multi-Agent Path Finding Under Real World Deadlines

Jingtian Yan†, Shuai Zhou†, Stephen Smith, Jiaoyang Li

— Under Review

- Main Contributions: Proposed REMAP, a general MAPF planning framework that bridges the gap between planning and real-world execution by incorporating a learned execution-time predictor (ExecTimeNet). Demonstrated its integration with MAPF-LNS and CBS to solve the novel MAPF with Real-world Deadlines (MAPF-RD) problem, achieving up to 20% improvement in solution quality in realistic simulations.

LSRP*: Scalable and Anytime Planning for Multi-Agent Path Finding with Asynchronous Actions

Shuai Zhou, Shizhe Zhao, Zhongqiang Ren

— Under Review (Journal Version)

Extended Abstract Doi: socs.v18i1.36016

— In SoCS 2025

- Main Contributions: This paper extends the previously proposed LSRP algorithm to an anytime version and is the first method capable of finding optimal solutions for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA). Given a reasonable amount of computation time, the proposed approach can efficiently handle instances with up to 1,000 agents, achieve near-optimal solutions, and eventually converge to the optimal one. This approach serves as a search framework that can easily incorporate other planners as shortcuts while retaining guarantees of eventual optimality.

Loosely Synchronized Rule-Based Planning for Multi-Agent Path Finding with Asynchronous Actions

Shuai Zhou, Shizhe Zhao, Zhongqiang Ren

— In AAAI 2025

Paper Doi: aaai.v39i14.33618 | Code: public.LSRP

- Main Contributions: This paper proposes a novel approach to Multi-Agent Path Finding with Asynchronous Actions, focusing on scalability over optimality. By integrating search-based (LSS) and rule-based (PIBT) planning, the proposed approach efficiently computes unbounded sub-optimal solutions for large-scale problems. Experiments demonstrate its ability to handle 10× more agents than baselines with only 25% longer makespan.

RESEARCH EXPERIENCE

CARNEGIE MELLON UNIVERSITY, ARCS Lab

Research Intern, Pittsburgh, United States

Apr 2025 — Present

Supervised by Prof Jiaoyang Li

- Co-lead research on an Multi-Agent Path Finding (MAPF) with real-world deadlines.
- Combine deadline-aware heuristics with learning-based execution models to adapt MAPF to real-world scenarios.
- Design, implement (C++), and evaluate planning algorithms in both simulation and on physical mobile robots.
- One Co-first-author paper submitted to **AAAI 2026**

UNIVERSITY OF CALIFORNIA, IRVINE, IDM Lab

Collaboration via RAP Lab, Irvine, United States

Mar 2025 — Jul 2025

Supervised by Prof Sven Koenig

- Lead research on an anytime planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).
- Enhance large neighborhood search with congestion-aware heuristics to improve solution refinement.
- Design, implement (C++), and evaluate algorithms in grid-based simulation;

SHANGHAI JIAO TONG UNIVERSITY, RAP Lab

Research Intern, Shanghai, China

Apr 2024 — Present

Supervised by Prof Zhongqiang Ren

- Led research on a scalable planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).

- Planned for 1,000 robots using rule-based strategies and extended to a general search framework with provable optimality.
- Designed, implemented (C++), and evaluated algorithms in grid-based simulation; analyzed theoretical properties such as completeness; led the writing of the research paper.
- One first-author paper accepted by **AAAI 2025** and one extended abstract accepted by **SoCS 2025**.

SERVICE

Reviewer: IROS 2025

SKILLS

- **OS:** Windows, Linux(Ubuntu)
- **Programming Languages:** Python, C/C++, Java, HTML, MATLAB
- **Additional Courses**
 - MIT: 6.S184 Introduction to Flow Matching and Diffusion Models
 - Berkeley: CS 285 Deep Reinforcement Learning
 - CMU: 16831 Introduction to Robot Learning
 - CMU: 16745 Optimal Control and Reinforcement Learning
 - CMU: 10301/601 Introduction to Machine Learning
 - CMU: 16-782 Planning and Decision-making in Robotics
 - UPenn: Robotics: Computational Motion Planning
 - UPenn: Robotics: Aerial Robotics

AWARDS

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| Outstanding Visiting Student Scholarship from USIEA Awarded to the top student in the UC Berkeley Global program; received 6,000 CNY | Guangzhou, China Mar 2024 |
| Merit Student of South China University of Technology Top student in the Robotics Engineering major, Class of 2022 | Guangzhou, China Feb 2024 |
| The Third Prize Scholarship by South China University of Technology Top 10% of students, receiving 10,000 CNY | Guangzhou, China Dec 2023 |
| Exchange Student Scholarship from South China University of Technology Awarded to outstanding students for overseas exchange, receiving 40,000 CNY | Guangzhou, China Jul 2023 |

REFERENCES

Prof. Jiaoyang Li

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Prof. Sven Koenig

Chancellor's Professor and Bren Chair, University of California, Irvine
E-mail: sven.koenig@uci.edu
Department: Donald Bren School of Information and Computer Science

Prof. Zhongqiang Ren

Assistant Professor, Shanghai Jiao Tong University
E-mail: zhongqiang.ren@sjtu.edu.cn
Department: University of Michigan - Shanghai Jiao Tong University Joint Institute